

REPORT

TO

HIS EXCELLENCY THE LORD LIEUTENANT OF
IRELAND,

REGARDING

ARKLOW HARBOUR.

Presented to both Houses of Parliament by Command of Her Majesty.



DUBLIN:

PRINTED BY ALEX. THOM & CO. (LIMITED), 87, 88, & 89, ABBEY-STREET,
THE QUEEN'S PRINTING OFFICE.

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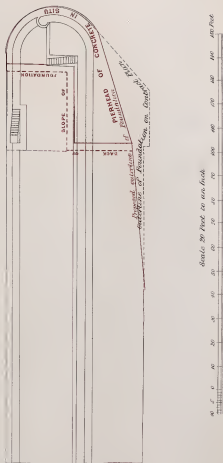
1886.

[C.—4678.] Price 3½d.

ARKLOW HARBOUR.

SKETCH PLAN ACCOMPANYING REPORT OF THIS DATE 8TH JAN^Y. 1886.

SHOWING PROPOSED ALTERATION TO PIERHEAD.



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TO

HIS EXCELLENCY THE LORD LIEUTENANT OF IRELAND,

REGARDING

ARKLOW HARBOUR.

In compliance with the instructions of His Excellency the Lord Lieutenant of Ireland that we should visit and report on Arklow Harbour Works, now in progress of construction, from the designs and under the control of the Board of Works, we visited the Harbour on the 5th of September last, accompanied by Mr. Manning, Engineer-in-Chief of the Board of Works, and obtained from him and his local Inspectors, and also from the Harbour Master, full information. We also met with several traders, merchants, and others acquainted with the Harbour, and interested in the trade. We had the advantage also of meeting and hearing the views of the Earl of Wicklow and the Earl of Carysfort. We have since then received from Mr. Manning certain borings showing the nature of the ground at the site of the outer portion of the breakwater, and we now beg to submit the following report:—

The damage done to the South Pier by the storms of the winter of 1884-5, and the measures proposed for its repair have been already described in Parliamentary Paper No. 154, which contains the report of the Engineer of the Commissioners of Public Works in Ireland, dated April, 1885.

In order, however, to render the subject clear, we may briefly state that the South Pier, now in progress, consists chiefly of an inner or wharf wall next the River Avoca, and an outer or storm wall and parapet, the space betwixt the walls being filled with rubble, on which the roadway is formed. Both walls, with the exception of the coping and steps of the wharf wall, are built of concrete, chiefly in the form of blocks, weighing from eight to ten tons, which are founded on the sand, which here forms the natural bottom of the bay, and during the winter of 1884-5 the sand was washed away from beneath the foundations of part of the sea wall, which then settled downwards and outwards.

The injured portions of the wall were taken down as low as the upper bed of the foundation course which had slipped outwards, and lay with an inclination seawards. Concrete, in bags, was deposited on the top of the foundation course, formed so as to bring up the sloping surface to the level, and on this the superincumbent wall was re-constructed, and, as a further protection, concrete blocks and rubble stone, have been deposited along the toe of the breakwater with the view of preventing a repetition of the undermining.

As regards the manner of completing the pier, and the construction of the pierhead, we find from borings which we have had made, that at the pierhead the sea-bed for a depth of nine feet, consists of sand and gravel, the lower portion, for four to five feet in thickness, being of compact gravel; immediately under this bed of gravel there is a depth of fourteen feet of soft muddy sand, and under this there is strong boulder clay, the upper surface of which being thirty-seven to thirty-eight feet under the level of low-water. The clay would afford a quite satisfactory foundation, but the great depth would involve a very large expenditure, and we have, therefore, to recommend that the foundations of the pierhead should stop at the top gravel bed, or about twenty-one to twenty-two feet under low water, and that from that level the pier should be carried up of solid concrete.

For the further security of that portion of the breakwater already built, we recommend that the measures adopted by the Chief Engineer be carried out and extended when necessary.

Following out this course, heavy rubble, similar to some which we saw in the quarry, and averaging 35 cwt. each stone, should be thrown along the outside of the storm wall already

built for a width of about forty feet, measured from the toe of the wall, and for a depth of about five feet. Rubble of a similar character should also be thrown along that portion of the storm wall not yet built, and round the pierhead, rising to a height of not less than ten feet under low water; also along the toe of the inner wall from the outer extremity inwards for a length of about 300 feet, and for a width of about thirty feet, and rising to within about twelve feet of low water.

We saw in the quarries a stock of selected rubble ready to throw in during winter seasons or after storms in case it should be required, and we think this a very wise and desirable provision, which should be continued; for it must be borne in mind that damage from heavy gales frequently occurs to unconsolidated sea works constructed on sand in exposed situations, and we cannot give any distinct assurance that none such will take place to the portion of the pier already built, but we trust that with the precautions we have suggested no serious injury will occur.

We have further to recommend that the quay wall adjoining the pierhead should be carried to the same depth for the distance landwards shown in blue lines on the sketch, or such other distance as, in the opinion of the Chief Engineer, may be deemed necessary. For the sake of simplifying the execution of this solid pierhead, the blocks already made for the sixty feet or so of the sea wall next the pierhead should be slightly reduced in breadth on their lower beds, and the lower block set by so much inwards, so as to gradually bring the present face slope of 1 to 1 to about $\frac{1}{2}$ to 1 at the point where the solid wall begins.

These additional works on the pierhead (in the desirability of which we hope the Chief Engineer to the Board of Works will concur) will involve only a small additional expenditure.

With regard to the pier on the north side of the river, considering that the channel has maintained its depth up to the present time, and that local authorities are adverse to its being proceeded with, we would recommend that its construction should be postponed until there is further experience of the effect which the South Pier, when completed, may have on the sea and river currents. The direction of the South Pier, we consider, has been judiciously chosen, and that it is preferable to other plans that have been suggested.

In making the foregoing recommendations it is not to be supposed that we can say exactly what may be found necessary as the work proceeds, especially when the shifting nature of the bottom is considered. Indeed we hardly know of any instance in which a large harbour work in such an exposed situation as that at Arklow has been completed without some modifications in the design being made from time to time during the course of the work, such as experience of the place seemed to call for, and it may be safely left to the Engineer to the Board of Works to make such further modifications as may appear necessary as the work proceeds.

THOMAS STEVENSON.

B. B. STONEY.

Edinburgh, 8th January, 1886.